



## Assessment Information

[CoreTrustSeal Requirements 2017–2019](#)

Repository: World Data Center for Solid Earth Physics, Moscow  
Website: <http://www.wdcb.ru/sep/index.html>  
Certification Date: 21 January 2019

This repository is owned by: Geophysical Center of the Russian Academy of Sciences



# Core Trustworthy Data Repository Requirements

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## BACKGROUND INFORMATION

### Context

R0. Please provide context for your repository.

#### **Repository Type.**

Domain or subject-based repository  
National repository system; including governmental  
Publication repository  
Library/Museum/Archives  
Research project repository

#### **Other (please describe)**

Global, Multidisciplinary

#### **Comments**

Global data repository - WDC for SEP collects, stores and disseminates data relating to the Earth as a whole, obtained from stations, institutes, centers, agencies of different countries of the world. WDC for SEP provides access of users to global information resources on geophysics.

Multidisciplinary repository- WDC for SEP deals with data on the solid Earth physics' disciplines: seismology, main geomagnetic field and its secular variations, archeo- and paleomagnetism, gravimetry, heat flow.

Domain or subject-based repository - Data collections are created in accordance with types of observations for each solid Earth physics discipline. For example, in seismology there are separate collections: seismograms, station bulletins with seismic wave times, earthquake catalogues, descriptions of some seismic events, etc. Therefore, the repository can be considered as subject-based repository.

National repository - In the last years WDC for SEP mainly concentrates on the collection and dissemination of the national and CIS countries data. One of the goals of the repository is the creation of the most comprehensive collection of national data.



Publication repository – WDC’s archive contains a number of publications with descriptions of significant seismic events, seismicity of regions, different paper-printed geophysical maps, etc.

Electronic journal (Russian Journal of Earth Sciences <http://rjes.wdcb.ru/>) is published in the Geophysical Center of the Russian Academy of Sciences (host organization) and the database of publications is also stored and available for use.

Archive - One of the functions of the WDC for SEP is the guaranteed long-term storage of geophysical data for access and use by a Designated Community.

Research project repository - Within the framework of the international projects “Geotraverse” and “InterMargins” database of geological and geophysical data and geodynamic models of the crust and upper mantle structure for the regions of the transition zone from the Eurasian continent to the Pacific Ocean was created and is maintained. <http://www.wdcb.ru/sep/traverses/traverse.html>  
<http://www.wdcb.ru/sep/lithosphere/lithosphere.html>.

During the participation in the IPY 2007-2008 project the site with data relating to the polar regions of the Earth was created in the Center <http://www.wdcb.ru/WDCB/IPY/IPY.html>

#### **Brief Description of the Repository’s Designated Community.**

WDC for SEP data are used as the basis for fundamental and applied scientific researches and education. The Designated Community includes scientists engaged in basic research and applied scientific research in the field of geophysics, geology and related fields of science, students, graduate students and teachers of higher educational institutions. WDC for SEP provides assistance to educational programs. WDC for SEP is targeted on the scientific organizations, separate researchers, universities and students in the different fields of sciences both in Russia and abroad.

#### **Level of Curation Performed.**

- A. Content distributed as deposited
- B. Basic curation – e.g. brief checking; addition of basic metadata or documentation
- C. Enhanced curation – e.g. conversion to new formats; enhancement of documentation
- D. Data-level curation – as in C above; but with additional editing of deposited data for accuracy

#### **Comments**

A. WDC for SEP in Moscow was created in 1971 as a part of WDC-B for the same purposes as the WDC-A and WDC-B were created earlier in the period of preparation for the project International Geophysical Year 1957-1958. The Center is responsible for the collection, guaranteed long-term storage and dissemination of geophysical data. The Center still performs these functions, keeps his appointment up to now. Much of the data assembled in the Center is distributed as deposited. Basically it refers to the historical data.



B. Each dataset collected in the Center is checked and analyzed. Metadata and necessary accompanying documents (for example, format description) are prepared in the Center.

C. In some cases, the dataset is converted to another format (for example, from Exel into text file) and in others a paper-printed form is converted into electronic form (PDF file or text file in ASCII codes).

D. In some cases, there is a need to edit the data. This is done in agreement and consultation with the producer (author) of the data. In fact, the Center is assisting the author in preparing a dataset for long-term storage in the Center and free distribution.

In all cases, the original datasets are stored unchanged; only copies of these datasets are edited.

Verification, analysis and all changes for the dataset are carried out by the specialist-curator in the relevant discipline. All changes made to the original datasets are recorded (fixed) in a special journal (log).

**Outsource Partners. If applicable, please list them.**

WDC for SEP cooperates with Research Institute of the Hydrometeorological Information - World Data Center (RIHMI-WDC) on the basis of the "Agreement on partnership, cooperation and scientific exchange between GC RAS and RIHMI-WDC". In the frame of these relationships the RIHMI-WDC provides long-term storage of backup copies of the WDC for SEP's archive datasets in its robotic library (robotic IBM system Storage 3500 Tape Library).

**Other Relevant Information.**

WDC for Solid Earth Physics in Moscow manages, maintains and provides services for the archive of historical and modern results of global observations related to the wide range of solid Earth physics' disciplines, obtained during the International Geophysical Year (1957-1958) and subsequent international projects, such as the "Upper Mantle", "Geodynamics Project", "International Polar Year 2007-2008" et al., results of land and sea expeditions, launches of satellites, special experiments, results of geophysical observations on global networks of observatories (seismological, geomagnetic).

The Center maintains extensive archive of the data on different media including paper, film and electronic media and provides all conditions for their long-time preservation.

**Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## ORGANIZATIONAL INFRASTRUCTURE

### I. Mission/Scope

**Compliance Level: 4**

**R1. The repository has an explicit mission to provide access to and preserve data in its domain.**

The mission of the WDC for Solid Earth Physics in Moscow is the collection, guaranteed long-term storage and dissemination of geophysical data. The center is responsible for data management.

WDC for SEP is guided by the principles of the ICSU-WDS Constitution and completely supports and agrees with the WDS data policy defined by the WDS Data Sharing Principles.

The Center provides full, open, timely, nondiscriminatory, and unrestricted access to data, metadata, products, and information, at no cost or at the cost of dissemination.

Data, metadata, products, and information in the WDC for SEP repository are open and are available for scientific and educational use without restriction and free of charge.

The Center aims to provide users with access to all data, metadata and products with minimum time delay.

These statements can be found on the WDC for SEP website <http://www.wdcb.ru/sep/>

All depositors and users are informed that the data security and continuity of access to the data are basic functions of the repository <http://www.wdcb.ru/sep/data.html>.

The statement of responsibility for fulfilling the WDC functions and data management is written down in the Charter of the Geophysical Center of the Russian Academy of Sciences (host organization) – GC RAS.

WDC for SEP prepares annual report on activities and every three years final report and presents them at the meetings of the GC RAS Scientific Council. The Scientific Council evaluates the work, progress and achievements of the WDC for SEP. Always the WDC for SEP receives a positive evaluation.

#### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## II. Licenses

Compliance Level: 3

**R2. The repository maintains all applicable licenses covering data access and use and monitors compliance.**

In the WDC for Solid Earth Physics in Moscow all data holdings are completely open and are available for scientific and educational use without restriction. It is for this reason that the Center has considered using of the Creative Commons (CC) licenses which were affiliated to the Russian Federation. It will take some time to look into this question and start the data licensing procedure in the WDC for SEP.

### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept

*Comments:*



### III. Continuity of access

Compliance Level: 4

#### R3. The repository has a continuity plan to ensure ongoing access to and preservation of its holdings.

WDC for SEP is responsible for the guaranteed long-term storage of geophysical data and ensuring access to data holdings.

Many historical data are available for users only in the WDC for SEP repository. That is, in this case, the Center is the only custodian. Current data usually are stored both by the producer (observatory, institute, analytical center or survey) and by the Center, which in this case is the primary custodian.

Since its creation in 1971 the WDC for SEP is hosted by the Geophysical Center of the Russian Academy of Sciences (GC RAS). In case of joining the GC RAS to another scientific institute, WDC for SEP will continue the activity as a part of new institute. In the event of termination of the GC RAS, the Russian Academy of Sciences will make a decision about where WDC for SEP should be transferred to continue its activity and transfer its archives and functions to another body of the RAS.

In confirmation the Center has a letter from the Russian Academy of Sciences signed by Acting Chair of Earth Science Department of the RAS.

The Center's activity is based on the three-year research programs and annual business plan approved by the Scientific Council of the GC RAS and the Federal Agency of Scientific Organizations of the Russian Federation.

To ensure the safety of data, backup copies of archive data sets have been made and transferred for storage to the robotic library (robotic IBM system Storage 3500 Tape Library) of our partner - Research Institute of Hydrometeorological Information - World Data Center (RIHMI-WDC).

#### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## IV. Confidentiality/Ethics

Compliance Level: 4

**R4. The repository ensures, to the extent possible, that data are created, curated, accessed, and used in compliance with disciplinary and ethical norms.**

The WDC for SEP repository contains only open data that can be freely distributed and used for research and educational purposes. WDC for SEP provides open access to all data.

There are no confidential information, data and personal data in the Center.

The observatories and the institutions that produce data and provide them to the Center have state licenses for their activities. The data is accepted by the WDC only if they have received the status of the data intended for the international exchange /open access by the decision of expert commission of the organization that produces data.

### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## V. Organizational infrastructure

Compliance Level: 4

**R5. The repository has adequate funding and sufficient numbers of qualified staff managed through a clear system of governance to effectively carry out the mission.**

WDC for Solid Earth Physics in Moscow is hosted by the Geophysical Center of the Russian Academy of Sciences (GC RAS). WDC for SEP is incorporated into Laboratory for Geophysical Data, which is a structural section of the GC RAS. GC RAS is the Federal State Budgetary Institution of Science that receives funding from the state through the Federal Agency of Scientific Organizations of the Russian Federation. GC RAS has the state license.

The statement of responsibility of fulfilling the functions of the WDC is written down in the Charter of the GC RAS.

The WDC for SEP activity is based on the three-year research programs and annual business plan approved by the Scientific Council of the GC RAS and the Federal Agency of Scientific Organizations of the Russian Federation.

The staff of the WDC for SEP consists of four research workers and one technician.

The research workers are high qualification specialists in geophysics, two of them graduated from Moscow State University. Each of them curates any discipline of solid Earth physics and is responsible for all operations with data from collection to long-term storage and publication in the network. Their functions include communication with data suppliers and data users. The technician deals with the maintenance of the archive in good condition, including backup, and registration of new data.

The Center has modern technical facilities, uses modern technologies for data processing and providing permanent online access to data.

Every five years scientific and technical staff is certified, as well as the activity of the GC RAS is reviewed by the Commission of the RAS every five years.

The scientific seminar for the staff of the GC RAS on the topics of modern scientific problems and achievements is held every two weeks. This is useful for professional development of the staff. Sometimes the GC RAS provides an opportunity for the WDC's staff to participate in conferences and meetings. But the budget of the GC RAS has very limited such opportunities.

### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept



*Comments:*



## VI. Expert guidance

Compliance Level: 4

**R6. The repository adopts mechanism(s) to secure ongoing expert guidance and feedback (either in-house, or external, including scientific guidance, if relevant).**

WDC for SEP is hosted by the Geophysical Center of the Russian Academy of Sciences and has good in-house experts for advice. They locate in adjacent rooms and can be contacted at any time. The WDC for SEP is provided by in-house skilled staff in information technology, scientific research and data science fields. In addition, the WDC for SEP can take advantage of external experts. They are members of the National Geophysical Committee or scientists of the Schmidt Institute of Physics of the Earth of the RAS (IPE RAS) and Pushkov Institute of Terrestrial Magnetism, the Ionosphere and Radio Wave Propagation of the RAS (IZMIRAN).

The Designated Community includes scientists engaged in basic research and applied scientific research in the field of geophysics, geology and related fields of science, students, graduate students and teachers of higher educational institutions.

The WDC for SEP communicates with the Designated Community through the messages (as necessary) or personal meetings (for example, during conferences). There is no strict schedule. Communication with the Designated Community is determined by the need to resolve the arising questions.

### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## DIGITAL OBJECT MANAGEMENT

### VII. Data integrity and authenticity

Compliance Level: 4

#### R7. The repository guarantees the integrity and authenticity of the data.

WDC for SEP receives data from the world-famous research organizations (e.g. the Geophysical Survey of the RAS) which are partners of WDC for SEP for many years. These organizations as depositors guarantee the integrity and authenticity of their data.

WDC for SEP fulfils the following functions in the data management process: data collection, registration, analysis, quality control, transformation, maintenance, backup copying, placing in a repository, publication in the network and long-term storage. The data management process also involves preparation of inventory catalogues, metadata, covering documents etc. The dissemination of data is carried out through the Internet web-site and by means of user requests.

Each dataset received by WDC for SEP is analyzed and information is obtained for dataset registration and for compilation of metadata: discipline, type of observations, period of observations, geographical territory, to which the observations are related, size of the data file, etc.

Dataset is registered in special registration database and information about it is entered into the inventory catalogue.

Two copies are made for this dataset. The initial dataset (original) and its first copy are placed separately in appropriate sections of the repository for the long time preservation without any changes.

The data in the second copy of the initial dataset is checked. For data quality control and analysis a specially developed programs are used implementing the following functions: verification of data records for compliance to the accepted in the WDC format; verification of main parameters of data in connection to their spatial-temporal characteristics; verification of the established and calculated limits of change of the parameters; search for inadmissible symbols and double records; verification of chronological order of data in files of sequential events.

Analysis of dataset includes determination of intervals of changing of separate parameters, of the number of records in dataset, definition of a record's length etc. Finally the protocol of verification and analysis is formed.

In the case of detection of errors or defects in the dataset, the Center in conjunction with the producer makes a decision about the necessary changes in dataset and data correction is being implemented together with him. If it cannot be done, a notice about the error is recorded in metadata and in log.



If the format of the dataset does not match the accepted international format or used in the WDC, the dataset is converted to necessary format that is recorded in the log.

After analyzing and making changes to the dataset, two backups are made and placed in appropriate section of the repository.

Annually initial dataset and its copies are checked to verify that they have not been altered or corrupted. The result of the check is written to the log.

The finished version of the data is published on the website.

Any subsequent changes in the data are recorded in a special log. All data versions are saved in archive.

Descriptions of dataset, data format and metadata of ISO 19115 standard are prepared.

All information about the dataset is recorded in a special log: the date of receipt, the data producer, the results of the checks, the changes made.

Data, metadata and inventory catalogues can be found on the WDC for SEP website. Repository maintains links to datasets from web sites of other centers and organizations.

#### **Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## VIII. Appraisal

Compliance Level: 4

**R8. The repository accepts data and metadata based on defined criteria to ensure relevance and understandability for data users.**

WDC for SEP receives data mainly from the Geophysical Survey of the RAS and leading research institutes usually on a permanent basis. The data before transferring it to the WDC are reviewed by experts to decide that data can be used freely for scientific and educational purposes. The Centre ensures that there are no gaps in the continuing data series and that all new important data sets in the range of solid Earth physics disciplines collected at the WDC for SEP are transferred to the Centre for storage. This ensures the completeness and representativity of the data collection.

Usually data is transmitted in accepted international formats or in formats used in the WDC. Descriptions of formats are on the website of the Center. Data is transmitted along with accompanying documents with detailed metadata.

The Center performs quality control of each transferred data set and checks the contents of the accompanying descriptive documents and metadata. In most cases, special software is used to check the quality of data. The verification protocol is saved. If an error or defect is detected in the data, the Center in conjunction with the producer makes a decision about the necessary changes in dataset and then the data correction is being implemented. In case the errors can't be corrected or expertise shows on bad quality of data, this dataset can't be accepted for storage in the WDC for SEP and returned to the producer.

If the format of the dataset does not match the accepted international format or the WDC format, the dataset is converted to necessary format that is recorded in the log. In this case, the original data set in the primary format and its copy are kept unchanged.

The metadata received together with the dataset from the producer is checked for completeness and is supplemented, if necessary, with the participation of the producer. Metadata of ISO 19115 standard for each dataset is compiled in the WDC for SEP.

When data in non-preferred formats appears in the Center, such data is published on the website together with the description of this unique format. In this case, the data set is subject to quality control as all other.

### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## IX. Documented storage procedures

Compliance Level: 4

### R9. The repository applies documented processes and procedures in managing archival storage of the data.

All procedures with data are managed in accordance with the instructions and are documented in the special journal (log). The instructions are developed based on long-term experience of data management in the WDC for SEP.

Each new data set received by WDC for SEP is considered as the initial (original).

Initial data set and its copy are placed in appropriate sections of the repository for the long time preservation without any changes. Other copy of initial data set and all subsequent versions of the data set and their copies are stored in another part of the repository.

Annually initial data set and all copies are checked to verify that they have not been altered or corrupted. The new copies are moved on new storage media. The result of the evaluation is written to the log.

All these procedures allow to restore any version of data at any time.

For restore data on the site its backup is provided regularly.

In order to restore data on the server from short-term disasters their backup is used.

#### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## X. Preservation plan

Compliance Level: 4

**R10. The repository assumes responsibility for long-term preservation and manages this function in a planned and documented way.**

WDC for SEP in Moscow was created in 1971 in the Russian Academy of Sciences for the purpose of collection, guaranteed long-term storage and dissemination of geophysical data for solid Earth physics disciplines. The Center possesses the large repository of the data on various media and provides all conditions for their long-time preservation. The statement of responsibility of fulfilling the functions of WDC is written down in the Charter of the Geophysical Center RAS. WDC for SEP is targeted on the scientific organizations, separate researchers, universities and students in the different fields of sciences both in Russia and abroad. The WDC for SEP has modern technical facilities, uses modern technologies for data processing and providing permanent free access to data.

The contract between the data depositor and WDC for SEP provides all the necessary actions with the data to meet the responsibilities of the WDC.

The depositor is acquainted with all actions that are performed with the data in the repository, he understands their necessity and agrees to their implementation. The depositor authorizes the repository to copy, transform (reformatting), store data and provide free access to them for scientific and educational purposes.

In each case of data transfer the depositor of a separate dataset and the repository agree on the format of the transmitted data with accompanying documents and in what format data will be stored in repository and published on the website.

In WDC for SEP there are instructions for performing actions on the data management for staff.

All data received by WDC for SEP are analyzed, registered in special database and placed in an appropriate section of the archive. The archive is structured. Reserve copies are made for electronic data. The original dataset and its copy are preserved without of change and separately from the main archive. Special software is used to carry out data analysis and data quality control. Metadata is converted to the ISO 19115 standard in consultation with the depositor

If, over time, there is a need to convert a dataset, for example into another format, more convenient to use, the dataset is modified, and its copies are made for backup storage. Users are given information about the conversion of data.

**Reviewer Entry**



*Accept or send back to applicant for modification:*

Accept

Comments:



## XI. Data quality

Compliance Level: 4

**R11. The repository has appropriate expertise to address technical data and metadata quality and ensures that sufficient information is available for end users to make quality-related evaluations.**

WDC for SEP in Moscow performs analysis and quality control of each dataset received for storage and checks the contents of the accompanying descriptive documents.

A specially created software is used to quality check data and configure incorrect data.

In the case of data not in electronic form (on paper), a visual (by humans) inspection is performed.

First of all, the data set is checked for compliance with the format. Then data is checked for presence of unnecessary characters. The chronological order of records is checked if it should be such. If the data refers to a specific territory, the geographical coordinates contained in the data are checked for compliance with the boundaries of the territory. Other parameters are also checked for compliance with the established limits, for example, year, month, day, hour, minute, second, etc.

In the case of detection of errors or defects in the dataset, the Center in conjunction with the producer makes a decision about the necessary changes in data set and data correction is being implemented together with him. If it cannot be done, a notice about the error is recorded in metadata and in log.

If the format of the data set does not match the accepted international format or used in the WDC, the data set is converted to necessary format that is recorded in the log.

Based on the accompanying data documents and data analysis, carried out at the Center, metadata is compiled in standard ISO 19115.

The Designated Community has the possibility to comment on, and/or rate data and metadata via e-mail.

Many data sets are accompanied by links to publications of related works.

### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## XII. Workflows

Compliance Level: 4

### R12. Archiving takes place according to defined workflows from ingest to dissemination.

In the WDC for SEP the curator on any discipline is guided by the instruction for data management developed on the basis of many years of experience of the Center's work and approved by the leadership of the Center. The instruction describes the entire workflow.

The instruction specifies the structure of the repository, the rules for data set registration, describes in detail the actions for analyzing and quality control of data, for creating backup copies and placing data set and its copies in the repository. Particular attention is paid to the rules of log filling, where all actions performed with each data set and copies are recorded.

The detailed information for users on the methods and conditions for obtaining data is posted on the Center's website. There is also information for data depositors.

All data stored in the Center are open and are freely distributed without restrictions for scientific and educational use. Commercial applications of the data, are, in general, not allowed.

The Center currently does not have a system for qualitative and quantitative checking of outputs. We are trying to solve this problem.

WDC for SEP has a certain amount of data that does not fall into the list of data collection profile. These data are registered in the database in the "Other data" section and located in the repository. Information about them is absent on the site of the Center.

WDC for Solid Earth Physics in Moscow manages, maintains and provides services for the extensive archive of historical data on such media as paper, film and microfiches and provides all conditions for their long-time preservation. Users can obtain information about these data from the inventory catalogs.

In the case of a request for such data from the user, a copy of the data is made if it's possible.

Making copies of data is not always possible. The Centre does not have equipment for copying paper-printed maps or large volume books. In these cases, the user can work with such data in the Center

In order to expand the information resources in electronic form, to preserve valuable historical data and make them more accessible for use the WDC for SEP carry out the project "Digital Preservation of Data" together with the WDC for Solar-Terrestrial Physics. The project aims to convert data from paper media into electronic form in the format adopted at the WDC. A scanner with good resolution is used to convert paper-printed data set into electronic document in the PDF format. After visual checking and editing the PDF file is converted into text format in ASCII codes using special software. A text file is checked and edited with use of



the special software. After that the full workflow cycle is carried out with the data set – registration, backup, metadata creation and so on. Then new data set is placed on the website in open access.

Over time, changes are made to the workflow and to the data management instruction.

For example, if earlier a record of a new data set was made in a paper journal, now information about the data set is entered in a computer database.

### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept

*Comments:*



### XIII. Data discovery and identification

Compliance Level: 3

**R13. The repository enables users to discover the data and refer to them in a persistent way through proper citation.**

On the website for each discipline there are the list of all types of observations and the lists of all datasets available in the Center.

In the case of large lists, tools have been created to facilitate searching. For example a system of links has been made to find the seismological catalogue in the list of catalogues in view of publications

[http://www.wdcb.ru/sep/seismology/regional\\_cat\\_publ.html](http://www.wdcb.ru/sep/seismology/regional_cat_publ.html).

In the section "Seismology" MySQL database containing data on earthquake parameters for the territories of several regions of the Russian Federation is created. The request form is used to access the database and obtain the requested data <http://www.wdcb.ru/sep/seismology/search/search.html>.

In the section "Earth Magnetic Field Data" the sensitive map can be used to receive data from any observatory of Russia [http://www.wdcb.ru/sep/magnetic\\_measurements/magn\\_obs\\_RF.html](http://www.wdcb.ru/sep/magnetic_measurements/magn_obs_RF.html).

The metadata compiled in accordance with the ISO 19115 standard for all datasets there are in the WDC for SEP. Metadata is created when a new dataset is received in the Center. Metadata are stored in a separate repository, and were included into the register of the International Polar Year Portal – IPYDIS, into the information system IPY-Info of the portal created in RIHMI-WDC for the organization of a system for long-term storage and dissemination of data for all types of research conducted in the Arctic and Antarctic and into the portal of all World Data Centers on the OAI-PMH protocol, created on the basis of the WDC for Marine Research at the University of Bremen, Germany.

The Geophysical Center of the Russian Academy of Sciences develops the project "Earth Science Database" (ESDB). The goal of the project is the creation of a modern system for registration and publication of geophysical data with assignment of DOI registered in the CrossRef system, which provides the ability to cite data in scientific publications. On the first stage of the Project DOIs are assigned to geomagnetic data accumulated in the World Data Center for Solar-Terrestrial Physics. WDC for SEP plans to join this project in the near future. Now for many datasets on the site there are samples of bibliographic references to data.

#### Reviewer Entry

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Accept

*Comments:*



## XIV. Data reuse

Compliance Level: 4

**R14. The repository enables reuse of the data over time, ensuring that appropriate metadata are available to support the understanding and use of the data.**

Since much of the WDC for SEP data is spatially distributed and has a coordinate reference, the ISO 19115 standard is used to create the metadata.

Basically, the repository provides data in the formats used by the Designated Community.

Many datasets have their own formats. For example, all earthquake catalogues contain mandatory parameters – date, time, event coordinates, – and many other parameters that are various in different catalogs. These data are provided to users in a unique format and accompanied by a detailed description of the format.

On the web pages for each dataset its full description is given. For example, for the catalogue of earthquakes in Turkey such parameters are indicated: number of events, time period, datafile size, geographical coordinates of the covered territory, description of the data source, format description and its features [http://www.wdcb.ru/sep/seismology/cat\\_Turkey.html](http://www.wdcb.ru/sep/seismology/cat_Turkey.html)

If there is a need to migrate data to a new hierarchy, the data in the old form remains available to users. For example, when seismological database combined several catalogues of earthquakes was created, then access to earthquake data was made possible through a query form to a database. But the possibility of access to each earthquake catalogue in the form of a separate file in its own format was preserved.

### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## TECHNOLOGY

### XV. Technical infrastructure

Compliance Level: 4

**R15. The repository functions on well-supported operating systems and other core infrastructural software and is using hardware and software technologies appropriate to the services it provides to its Designated Community.**

WDC for SEP has a catalog of metadata with descriptions of information resources on the basis of ISO 19115.

The Center has all the necessary software for carrying out all kinds of work with data. Software products are either licensed or freely distributed. For the analysis and reformatting of datasets, the software package created for this purpose is used.

The technical infrastructure of the WDC for SEP is maintained and administered by the Geophysical Center of the RAS. All documentation for the software is available and stored by the system administrator. The WDC for SEP data and databases are on a web server running the Linux operating system.

The WDC for SEP web server is connected by a fiber-optic communication channel to the public Moscow southern core network (to a node in Moscow State University) with a capacity of 1 Gbit/s and operates around-the-clock.

#### Reviewer Entry

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Accept

*Comments:*



## XVI. Security

Compliance Level: 4

**R16. The technical infrastructure of the repository provides for protection of the facility and its data, products, services, and users.**

The WDC for SEP assesses risks and creates a consistent security system. The repository is taking appropriate measures to counter the threats.

Original data and their backups are stored in different storages. An access to the storage is restricted and under control. Full backup (complete copy of all data) is carried out monthly and quarterly. Every week an incremental backup is done.

For quick restoration of a server, in emergency, the virtualization technology is used. The server works on a virtual machine, which is backed-up once a week. In case of a failure the server can be restored quickly.

For additional protection each member of WDC' staff (further "user") is supplied except the unique identifier with the unique password and if identifiers of users in system are accessible to the system administrator, passwords of users are stored more often in the special codes and are known only to the users. Properly authorized persons or processes operating from their name acquire the right to read, write, create and delete the information. At each reference of the user to programs or the data, an admissibility of the given reference (a coherence in action of the specific user with the list of the actions permission for him) is checked.

Network access is made in the following way:

- Authentication, authorization, and access control for input registration data.
- Admission to certain working conditions according to the rules, prescribed for every user.
- Passwords are encrypted at application level, to conceal them from users, protocol HTTPS is supported, used for cryptographically protected channel for exchange of data.
- There is a firewall, which prevents any attempts to get unauthorized access to data.
- Patches play an essential role in ensuring security of data. Patching is automatic.
- The system is monitored around-the-clock.
- The system is protected from harmful programs, including viruses, with the help of corresponding Anti-virus programs, which are usually linked to firewall, and spam-filters.

The building, where the WDC for SEP is located, is guarded 24 hours a day, the entrance to the building is granted according to passes and documents, all received and returned keys are recorded in a journal, the fire and security alarm systems are installed in every part of the building.



**Reviewer Entry**

*Accept or send back to applicant for modification:*

Accept

*Comments:*



## APPLICANT FEEDBACK

### Comments/feedback

The application form in our opinion is too rich and intensive document.

When completing the application form, some requirements caused difficulties. From our point of view, the names of the requirements do not always agree well with the requirements for which information should be provided.

For example, requirement R12 "Archiving takes place according to defined workflows from ingest to dissemination". Questions arise about the following topics: "Appraisal and selection of data" and "The types of data managed and any impact on workflow".

### Reviewer Entry

*Accept or send back to applicant for modification:*

Accept

*Comments:*